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# GENERAL SCIENCE AND ABILITY

## PART - II

### SECTION - I

Q.1.

(b)

## DARK MATTER AND DARK ENERGY.

### DARK MATTER

Dark-matter is a matter like substance, that does not absorb, emit or reflect light, present in the universe.

### Proportion of Dark-matter present in the universe

Around 27% of the dark-matter makes up total energy mass in the universe.

### Detection of Dark-matter

- Dark-matter is detected due to its "gravitational pull."

### Function of Dark-matter

- The presence of dark-matter in the

Universe helps to hold the galaxies due to the presence of gravitational pull.

- Dark-matter also helps to understand the formation of galaxies in the universe.

## DARK-ENERGY

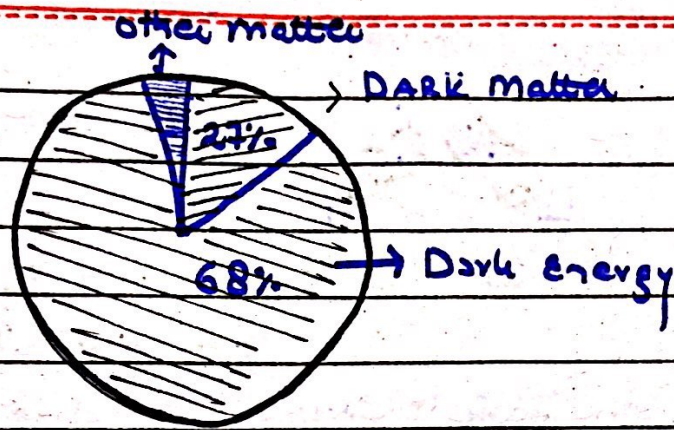
Dark-energy is energy. Like matter presents in the universe, that is involved in the expansion of the universe.

### Proportion of Dark-energy in the Universe

Around 68% of the total mass in the universe constitute of dark-energy.

### Function of Dark-energy

- Dark-energy is involved in the expansion of the universe.
- Dark-energy helps to understand the future of the universe that whether it will expand or reverse.



(d)

## COVALENT BONDS

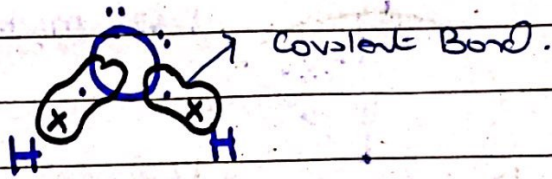
"Covalent bonds are those chemical bonds that are formed due to mutual sharing of electrons between the atoms."

### Features of Covalent Bonds.

- Covalent bonds are type of chemical bonding that takes place between two or more atoms.
- Covalent bond involves the mutual sharing of electrons.
- Unlike, ionic bonds they don't involve the complete transfer of electrons.

example: water molecule ( $H_2O$ )

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### • Structure of water molecule $H_2O$

In water molecule Oxygen is sharing its two electrons with each electron with each hydrogen atom. Such type of bonding is known as "Covalent bonding".

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Q2.

(a)

## LUNAR ECLIPSE

"Eclipse is an obstruction caused by one astronomical body due to the presence of another astronomical body."

There are two types of Eclipse:

- (i) Lunar Eclipse
- (ii) Solar Eclipse

"Lunar Eclipse occurs when the earth comes between the sun and the moon."

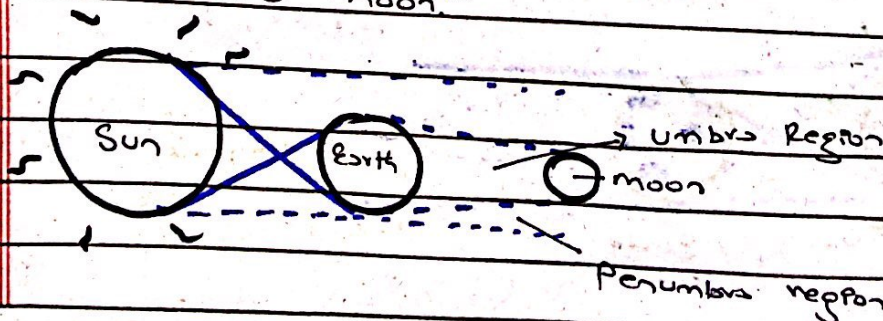
- Lunar Eclipse can only occur when the moon is full.

### TYPES OF LUNAR ECLIPSE

1. Total Lunar Eclipse.

Total Lunar Eclipse occurs when the earth is aligned in a straight line joining the centre of the sun and the moon.

Total lunar eclipse is also known as "Blood red moon."

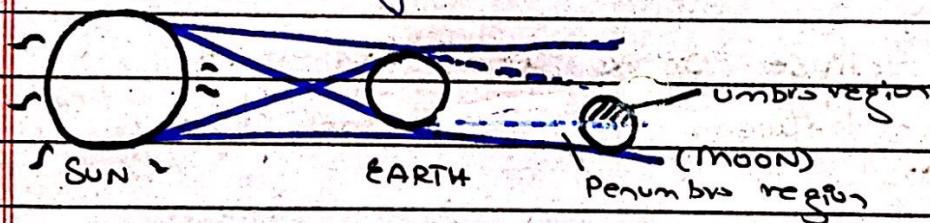


During the total lunar eclipse, the darkest shadow of the earth known as umbra completely covers the moon.

### 2. Partial Lunar Eclipse

Partial lunar eclipse occurs when the earth is either below or above the line joining the centre of the sun & the moon.

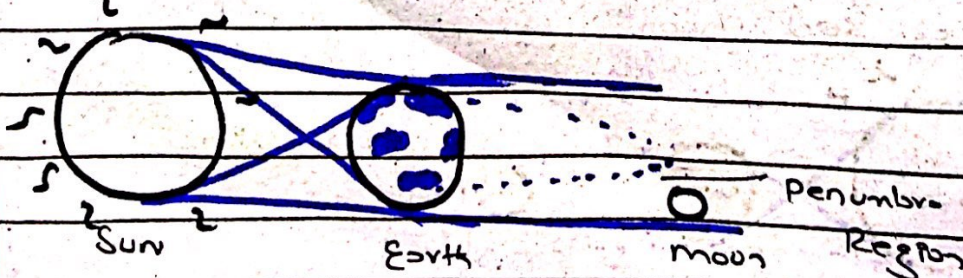
Here, the moon lies in penumbra region partially.



### 3. Penumbral Lunar Eclipse

Penumbral lunar eclipse occurs when the moon completely falls in the penumbra region of the earth's shadow.

This type of eclipse is often misunderstood as full moon because it can be hardly observed, and the moon appears as full.



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(b)

## FUNCTIONS OF ENZYMES WITH EXAMPLES.

- Enzymes are the catalysts that speeds up the biological functions in human organisms.

- Enzymes help to break down larger molecules into smaller molecules.

e.g.

Galactose break down starch into glucose

## SECTION - II

Q.6

(a)

SolutionValue of  $k$  is unknown.9, 8, 10,  $k$ , 12if the value of mean = 15  
then:

$$\text{Mean} = \frac{9 + 8 + 10 + k + 12}{5} = 15$$

$$9 + 8 + 10 + k + 12 = 75$$

$$39 + k = 75$$

$$k = 75 - 39$$

$$k = 36$$

(b)



(c)

Volume of football =  $x$   
 radius of football = 12 cm.

Volume of sphere =  $\frac{4}{3} \pi r^3$

$$\frac{4}{3} \times 3.14 \times (12)^3 = \boxed{7,234 \text{ cm}^3}$$

(d)

Solution

-10, -8, 6, 40, 102, ?

This is arithmetic series where addition and subtraction of the numbers take place.

Firstly if we add

$$+2 \text{ then } +14 + 34 + 62$$

Then the series we get

$$+2, +14, +34, +62$$

Now, if we subtract the series we get

$$12, 20, 28 \rightarrow \text{sequence of } 8$$

Now if we add 8 in 62

$$\text{we get } 36 + 62 = 98$$

$$98 + 102 = 200$$

Thus the next digit in the series

$$\text{is } \boxed{200}$$

Q(7)

Solution

If Brain uses the below formula to calculate the amount of charge

$$\text{Charge} = \text{£}20 + 4n$$

and if  $n = 7$

then Brain would charge

$$\text{£}20 + 4(7)$$

$$\text{£}20 + 28$$

$$= \boxed{\text{£}48}$$

(b)

(1) valcief

(2) tyhniaum

(3) orsehcc

(4) monitash

(5) lareph

(c)

$$(A \cup B)' = A' \cap B'$$

$$A = \{10, 11, 12, 13, 15\}$$

$$B = \{10, 12, 14\}$$

$$U = \{10, 11, 12, 13, 14, 15, 16, 18\}$$

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$$A' = U - A$$

$$A' = \{14, 16, 18\}$$

$$B' = U - B$$

$$B' = \{11, 13, 16, 18\}$$

$$\Rightarrow A' \cap B' = \{16, 18\}$$

To find  $A \cup B$  first

$$A \cup B = \{10, 11, 12, 13, 14, 15\}$$

Now  $(A \cup B)'$

$$(A \cup B)' = U - A \cup B$$

$$\Rightarrow (A \cup B)' = \{16, 18\}$$

HENCE PROVED THAT  $(A \cup B)' = A' \cap B'$